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the long acuminate point; upper sheath enclosing the base of the panicle, which is narrow, erect, and 6–8 inches long, the branches in twos or threes and appressed; outer glumes unequal, lower one 6–7 lines, upper about 5 lines long, both 3-nerved, acuminate; flowering-glume 3–5 lines long, hairy, hairs longer above, and at the apex forming a white crown a line or more long; awn rather slender, 8–9 lines long, not hairy; stipe short, very acute, pubescent; palet less than a line long, obtuse and adherent to the grain.

Differs from *S. viridula* particularly in the unequal glumes, the hairy crowned flowering-glumes, the more slender awn, and the very short palet.

Collected on dry hill-sides at Sante Fe, New Mexico.

FESTUCA CONFINIS.—Culms about 3 ft. high, rather rigid, smooth, radical leaves half as long as the culm, those of the culm 2 or 3, the sheath loose and shorter than the internodes, blade flat, 6 inches long, 3 lines wide, ligule short, scarious, obtuse; panicle 4–5 inches long, strict; branches in twos or threes, unequal, erect, the longest twice as long as the internodes, subdivided below the middle, rhachis and branches nearly smooth; spikelet oblong, 3- to 5-flowered, the outer glumes ovate-lanceolate, thin, smooth, 1-nerved, the upper one about 3 lines long, the lower a little shorter; flowering-glumes about 3 lines long, prominently 3-nerved, scabrous, rather rigid, rounded on the back, acutish to very acute, but not awned; palet about equaling its glume, scabrous-ciliate on the keels, adherent to the grain.

This differs from *Poa* chiefly in the rigidity of the culms and the thicker, harsher, more rounded flowering-glumes.

Collected at Peu Gulch, Colorado, altitude 8,000 ft.

ELYMUS SAUNDERSII.—Culms tufted, 2–3 ft. high, slender but firm, smooth; radical leaves involute-setaceous, about half as long as the culm, culm-leaves about 3, the sheaths smooth, the upper one long, the blade rigid, 5–6 inches long, finely scabrous, becoming involute, ligule obsolete; panicle 5–7 inches long, rather cylindrical and flexible, rhachis with 20 or more joints, which are 3 to 4 lines apart; spikelets 2- to 4-flowered, generally in pairs, at least below, frequently singly above and sometimes throughout; upper glumes linear-lanceolate, 3- to 5-nerved below, with 2 short teeth at the apex, scabrous on the midnerve and running into a slender scabrous awn an inch or more in length; flowering-glumes lanceolate, 5-nerved, finely scabrous, 2-toothed at apex, 5 lines long to the awn, which is slender and 1 to 1.5 inch long; palet wide and flat, nearly as long as its glume, bifid, scabrous on the 2 sharply flexed keels. The whole spike generally of a purple color.

One of the handsomest species of the genus. Collected at Veta Pass, Colorado, 9,000 ft. altitude.

On the Existence of a Peculiar Flora on the Kittatinny Mountains of North-western New Jersey.

By N. L. BRITTON.

The occurrence of a group of plants which, from preconceived notions, seem to be out of place in any region, is always of interest to botanists, and especially so to those who enjoy the study of the geographical distribution of species and its various causes. I can contribute a brief chapter to the literature of this subject with some facts obtained during two recent expeditions to the Kittatinny (Shawangunk) Mountains of New Jersey and New York, made for the purpose of more thoroughly elaborating the flora of the former State.

This mountain chain forms a wall of almost constant altitude, averaging over 1,200 feet in height, along the eastern side of the valley of the Delaware River, from Port Jervis to the Water Gap, and excludes many plants of more northern and western range from the interior portions of New Jersey. Its summits and western slopes are composed of a coarse or fine, very hard silicious conglomerate or sandstone, with little soil but that derived from the limited disintegration of these rocks. While the mountain sides and summits are extensively glaciated, there is very little glacial drift on the ridge, as Dr. A. A. Julien has pointed out* for the vicinity of Sam's Point, New York, and my observation is that it holds this character throughout its extent in New Jersey. The soil of the summit and slopes is cansequently highly silicious.

My first trip was made on August 31st, 1883, to the vicinity of High Point, Sussex Co., and the following unlooked for plants were noticed:

Juncus Greenii, Oakes & Tuckerm., a species previously known only from sandy soil along or near the coast, was found on the very top of High Point at an elevation of 1,800 ft. The plants were somewhat smaller than those growing abundantly at several points along the Raritan River, the Staten Island, Long Island and New England coasts, but Dr. Engelmann pronounced them this species, shortly before his death. *Solidago puberula*, Nutt., was very abundant on the mountains, both here and at Sam's Point, and constantly associated with *S. bicolor*. Before this I had been accustomed to find it only along and near the coasts and in the sandy plains of the southern part of the State. *Orontium aquaticum*, L., grew along the shore of Lake Nascia, a pond just below the summit.

These plants and the shortly previous discovery by Mr. A. H. Smith, near Lake Mohunk,† of *Corema Conradii*, Torr., a plant whose limited distribution renders its presence there doubly interesting, induced me to make special search for other sand-loving species during my visit to the same region on June 15th of the present year. As the result of this, *Prunus pumila*, L., the sand cherry, which grows on sand bars and islands in the Delaware River, and in similar situations northward, was found on the summit of the mountains southwest of High Point, among dry rocks; *Tephrosia Virginiana*, Pers., and *Lespedeza hirta*, Ell., so abundant in sandy soil southward, in several places on the western slope; *Lupinus perennis*, L., and *Calystegia spithamæa* Pursh, near the summit, and the latter known at present from but two other localities in New Jersey, but generally a sand plant. The immense quantities of *Quercus ilicifolia*, Wang. (in the

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* *Trans.* N. Y. Acad. Sci. Vol. iii., ined.

† See BULL. TORR. CLUB, ix.

Shawangunks, as in the pine barrens, the most abundant shrub), and the substitution of *Pinus rigida*, Mill., the pine barren pine, on the mountains, for the *P. Strobus*, L., of the surrounding country, contribute to the list of plants whose natural habitat is low sandy ground rather than elevated mountain districts, though the last named may hardly be regarded as typical of sandy regions.

The reason for these somewhat remarkable occurrences is easily found in the similarity of the soil on the mountains, in chemical composition, to that of the plains bordering the coast, this being with some of these plants evidently more potent than climate, for the average annual temperature of these mountain districts is seven or more degrees lower than that of the sea-coast.* This has its effect, however, in modifying the flora, as seen in the *Potentilla tridentata* and *Pyrus Americana*, DC., of High Point, *Stellaria borealis*, Bigel., and *Habenaria viridis*, L., var *bracteata*, Reich., of its slope; *Arenaria Grœnlandica*, L., and *Juncus trifidus*, L., of Sam's Point, with other plants of northern range.

Notes on South-western Plants.—The appearance of Dr. Gray's long-expected work on Compositæ calls for changes in the names under which several of my plants were distributed.

*663=*Malacothrix sonchoides*, T. & G., but the crown is plainly about 30-toothed.

*665 }
*666 } =*Senecio multilobatus*, T. & G.

*203=*Trixis angustifolia*, DC., var. *latiuscula*, Gray.

*670=*Senecio Douglasii*, DC.

*651=*Bigelovia Drummondii*, Gray. A form of *Bigelovia graveolens*, Gray, collected at Casuino, A. T., differs from the description in having the leaves distinctly rigid.

*780 is not *Verbena polystachya*, but probably an extreme form of *V. stricta*, Vent. It requires further comparison.

The following notes should be published as extending the ranges of species beyond those credited to them.

Lonicera involucrata, Banks, Mt. Humphreys, A. T.
Galium Rothrockii, Gray, Mogollon Mts., N. M.
Stevia Plummeræ, Gray, Mogollon Mts., N. M.
Kuhnia eupatorioides, L., at various places in N. M., and A. T.
Brickellia floribunda, Gray, Burro Mts., N. M.
Aphantostephus Arizonicus, Gray, Central N. M.
Erigeron glabellus, Nutt., Mogollon Mts., N. M.
Erigeron flagellaris, Gray, Central Arizona.
Erigeron Rusbyi, Gray, Mogollon Mts. of South-western N. M., not of A. T.
Helianthus Maximiliani, Schrader, Central Arizona.
Coreopsis Drummondii, T. & G., Central Arizona.
Schkuhria Hopkirkia, Gray, Western N. M.
Hymenopappus Mexicanus, Gray, Northern Arizona.
Polypteris Hookeriana, Gray, Central N. M.

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* See Mr. J. C. Smock in Ann. Rep. State Geologist for 1881.